

Date: Tuesday, 11/6/2007 1:11:46 PM  
User: Kim Johnston

## Process Sheet

48

Customer : CU-DAR001 Dart Helicopters Services Drawing Name : OH-58 FWD X-TUBE ASSEMBLY - UNDER REVIEW  
Job Number : 35531  
Estimate Number : 12526 Part Number : D058676101  
P.O. Number : Drawing Number : D058-676-141 REV A2  
This Issue : 11/6/2007 S.O. No. : Project Number : N/A  
Prsht Rev. : NC Drawing Revision : A2 UNDER REVIEW  
First Issue : 1 / Type : LANDING GEAR Material :  
Previous Run : 35530 Due Date : 11/30/2007 Qty: 1 Um: Each  
Written By :  
Checked & Approved By :  
Comment : Est Rev: E 06.09.11 Reformat IEC

## Additional Product

Job Number:



Seq. #:

Machine Or Operation:

Description:

1.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D058-676-101CHG001

2.0

D6001105

Crosstube



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D6001-105 Crosstube 325461

Unable to enter

BG 07.11.10

①

3.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Fill tube with sand &amp; install plugs on both ends as per Folio FA085

2-Turn first side as per Folio FA085

3-Deburr &amp; Inspect for surface damage.

BG 07.11.12

①

4.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

BG 07.11.12

①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Drawing Name: OH-58 FWD X-TUBE ASSEMBLY - UNDER REVIEW

Job Number: 35531

Part Number: D058676101

Job Number:



Seq. #:

Machine Or Operation:

Description :

5.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA085

2-Deburr & Inspect for surface damage.

BC 07-11-12

①

6.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

BC 07-11-12

①

7.0

QC8

SECOND CHECK



Comment: SECOND CHECK

CPM/07-11-12

②

8.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Remove sand and plugs

2-Scribe part # and batch # using vibrating stylus as per Dwg D058-676-141

Inside of Cuff(Donot engrave on outside of tube)

BC 07-11-12

①

9.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

ANM  
07-11-13

1-Polish entire outside surface of crosstube

10.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

DP  
7-11-13

11.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

ANM  
07-11-13

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Drawing Name: OH-58 FWD X-TUBE ASSEMBLY - UNDER REVIEW

Job Number: 35531

Part Number: D058676101

Job Number:



Seq. #:

Machine Or Operation:

Description :

12.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

DP

7-11-13

13.0

BENDING

BENDING MACHINE



Comment: BENDING MACHINE

Bend tube as per Dwg D058-676-141 using CNC bender program OH58-fw and Folio FT014

EL 7-11-13

14.0

QC6

DIMENSIONAL CHECK



Comment: Inspect dimensions and work To Current Step

SCUAP

(P10)

15.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D058-676-141 using drill Jig DT8541 & DT8542

2-Ream hole to finish size in tube as per Dwg D058-676-141 using drill Jig DT8541 & DT8542. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D058-676-141

16.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

1-Pressure wash as per QSI 005

2-Chemical Conversion Coat as per QSI 005 4.1

17.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

18.0

QC5

INSPECT WORK TO CURRENT STEP




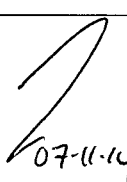

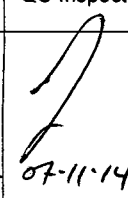
Comment: INSPECT WORK TO CURRENT STEP

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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07-11-14	B.0	Tube is very un-even. by 1.375" RC: Tube over bent on one side while bending with the old program.		Modify, create new program, by bending the opposite side. Scrap & destroy QC Note: All other bent tubes are good.	EZ 7-11-14	 07-11-14	 07-11-14	 07-11-14

NOTE: Date & initial all entries

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Job Number: 35531

Part Number: D058676101

Job Number:



Seq. #:

Machine Or Operation:

Description :

19.0

OUTSIDE SERV.10

OUTSIDE SERVICES -LG



Comment: Sub-Contracting OUTSIDE SERVICES  
Liquid Penetrant Inspection as per QSI 0380  
Issue P/O: \_\_\_\_\_  
LPI as per ASTM 1417 Level 2  
Attach copy of NDT results to work order

20.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1  
Inspect for transit damage Ensure copy of NDT results attached to work order.

21.0

QC6

DIMENSIONAL CHECK



Comment: Inspect for damage & ensure results are as per Dwg D058-676-241

22.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

23.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint  
Then, Wrap in plastic bag to protect from scratches

24.0

D2856400

Abrasion Strip



Comment: Qty.: 0.5800 f(s)/Unit Total : 0.5800 f(s)  
Pick:  
Qty Part number Description Batch  
2 D2856-400-694 Abrasion Strip \_\_\_\_\_

25.0

D28911

Support 2.25 dia



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)  
Pick:  
Qty Part number Description Batch

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Part Number: D058676101

Job Number:



Seq. #:

Machine Or Operation:

Description :

2 D2891-1

Support

26.0

MS2192020

Clamp (per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-20

Clamp

27.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Install abrasion strips as per QSI 035 using DT8579

2-Install supports and clamps as per Dwg D058-676-141. Torque clamps to 80-100 in lb.

28.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

29.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

30.0

AN532A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick: Packing Kit

Qty Part number

Description Batch

4 AN5-32A

Bolt

31.0

AN960JD516

Washer



Comment: Qty.: 8.0000 Each(s)/Unit Total : 8.0000 Each(s)

Pick: Packing Kit

Qty Part number

Description Batch

8 AN960JD516

Washer

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Job Number: 35531

Part Number: D058676101

Job Number:



Seq. #:

Machine Or Operation:

Description :

32.0

MS21042L5

Nut



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick: Packing Kit

Qty Part number

Description Batch

4 MS21042L5

Nut (or -5)

33.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

34.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D058-676-101

Location: \_\_\_\_\_

35.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



*W 8-11-15*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

<b>DART AEROSPACE LTD</b>	<b>Work Order:</b>	35531
<b>Description:</b> Crosstube Assembly (OH-58 High Fwd)	<b>Part Number:</b>	D058-676-141
<b>Inspection Dwg:</b> D058-676-141 <b>Rev:</b> A2		Page 1 of 1

### FIRST ARTICLE INSPECTION CHECKLIST

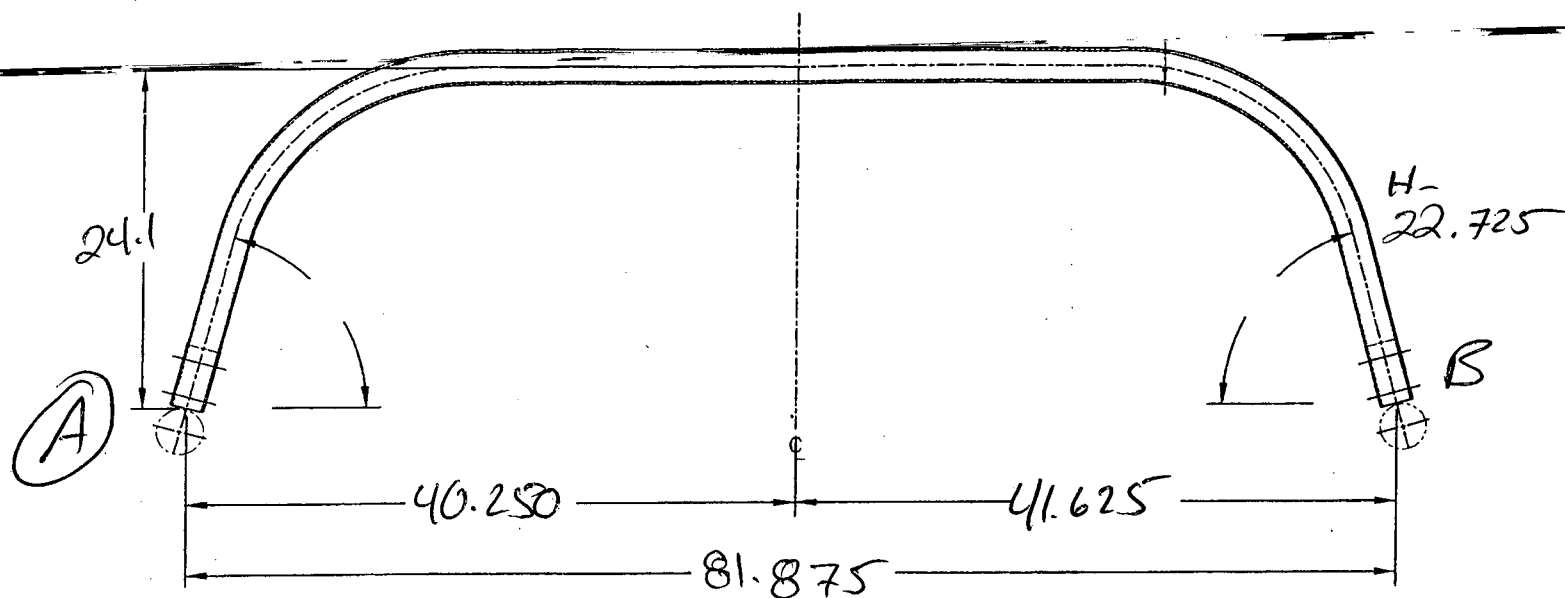
☒ First Article ☐ Prototype

Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.241	✓		
	2.069	+0.005/-0.000	2.074	✓		
	2.113	+0.005/-0.000	2.118	✓		
	2.158	+0.005/-0.000	2.162	✓		
	2.183	+0.005/-0.000	2.188	✓		
	2.209	+0.005/-0.000	2.213	✓		
	2.235	+0.005/-0.000	2.238	✓		
	0.100	+/-0.010	.100	✓		
	0.144 x 30°	+/-0.010	.144	✓		
	R0.063	+/-0.010	.063	✓		
	R0.500	+/-0.010	.500	✓		
	4.207	+/-0.001	4.207	✓		
SIDE B	2.240	+0.005/-0.000	2.240	✓		
	2.069	+0.005/-0.000	2.073	✓		
	2.113	+0.005/-0.000	2.116	✓		
	2.158	+0.005/-0.000	2.162	✓		
	2.183	+0.005/-0.000	2.188	✓		
	2.209	+0.005/-0.000	2.213	✓		
	2.235	+0.005/-0.000	2.238	✓		
	0.100	+/-0.010	.100	✓		
	0.144 x 30°	+/-0.010	.144	✓		
	R0.063	+/-0.010	.063	✓		
	R0.500	+/-0.010	.500	✓		
	4.207	+/-0.001	4.207	✓		
	103.03	+/-0.020	103.05	✓		

<b>Measured by:</b> BG	<b>Audited by:</b> [Signature]	<b>Prototype Approval:</b>	N/A
<b>Date:</b> 07.11.12	<b>Date:</b> 07.11.12	<b>Date:</b>	N/A
<b>Rev</b>	<b>Date</b>	<b>Change</b>	<b>Revised by</b>
A	07.03.26	New Issue (P/O D058-676-101)	KJ/JLM [Signature]
			<b>Approved</b> [Signature]

DART AEROSPACE LTD		Work Order:	35531
Description: Crosstube High Fwd (OH-58)		Part Number:	D058-676-101
Inspection Dwg: D058-676-141 Rev: A		Page 1 of 1	

Required Dimension	Min	Max
Height	23.52	23.64
1/2 Span	40.86	40.98
Angle	54	56
Total Span	81.72	81.96



Comments
tube has 1.375" difference in height
tube is scrap
J. J. J.

QC15 Inspection	
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	J. J. J.



DESIGN <i>CP</i>	DRAWN BY <i>CP</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>#</i>	APPROVED <i>#</i>	DRAWING NO. D058-676-141	REV. A SHEET 1 OF 3
DATE 00.11.17		TITLE CROSSTUBE ASS'Y (OH-58 HIGH FWD) NTS	
A	00.11.17	NEW ISSUE	

Qty	Part Number	Description
X	D058-676-141	CROSSTUBE ASSEMBLY (OH-58 HIGH FWD)
1	D6001-105	CROSSTUBE
2	D2856-400-694	ABRASION STRIP
2	D2891-1	SUPPORT
4	MS21920-20	CLAMP

#### GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6001-105  
FINISHED LENGTH = 103.03±0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-400-694 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D2891-1 SUPPORT, PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) SEAL EDGES OF SUPPORTS AND ABRASION STRIP USING SIKAFLEX-241/291 SEALANT.
- 12) TORQUE CLAMPS 80 TO 100 IN-LB.

*PH 07.06.26*  
**UNDER REVIEW**  
*06.10.18 DH*  
*Update New P.O.*

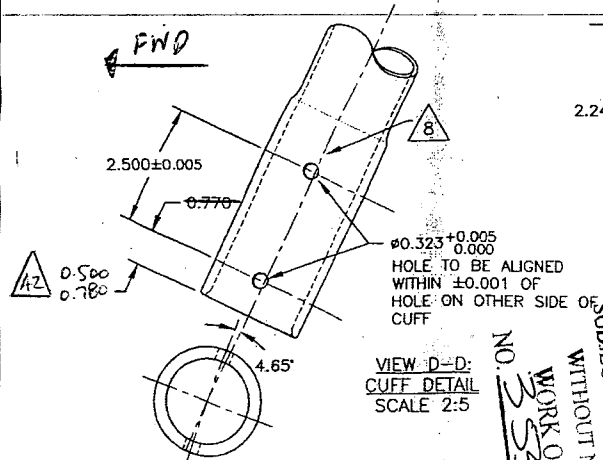
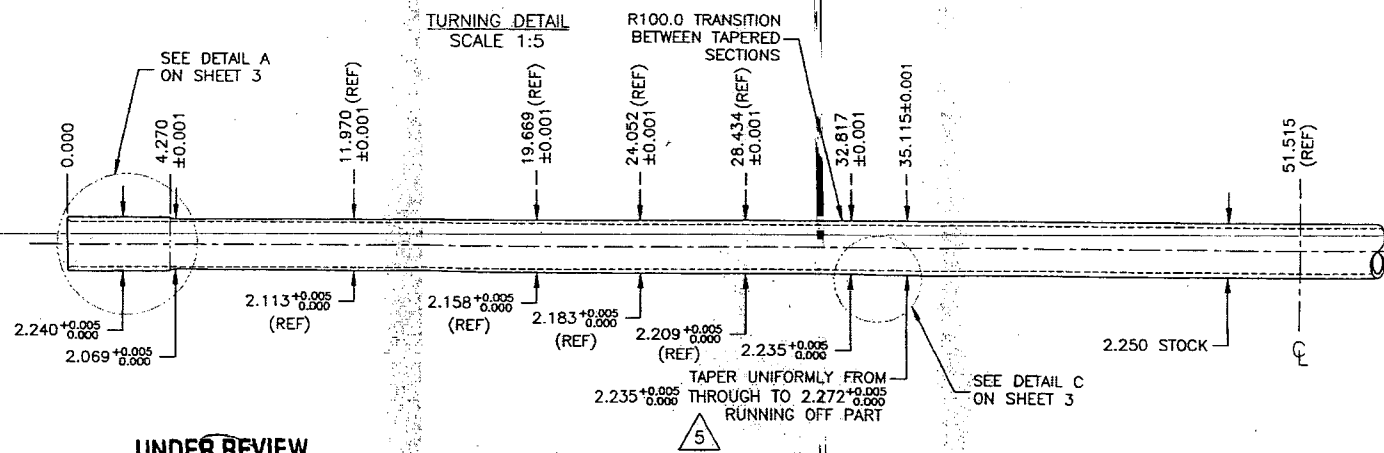
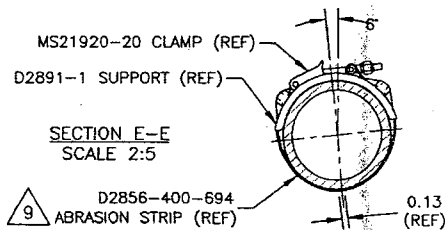
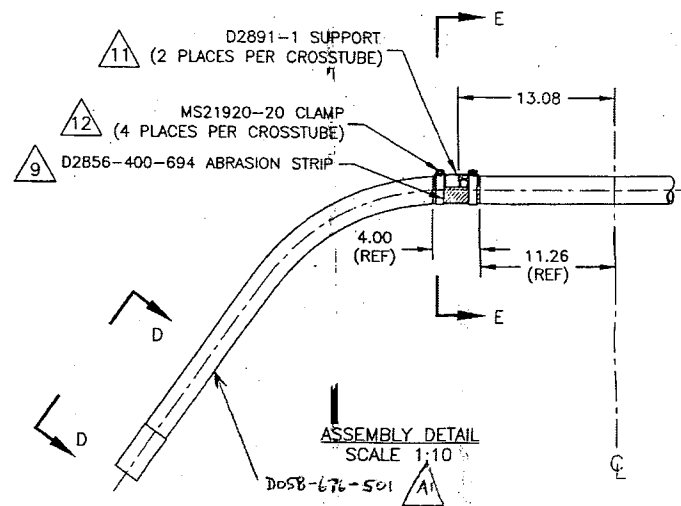
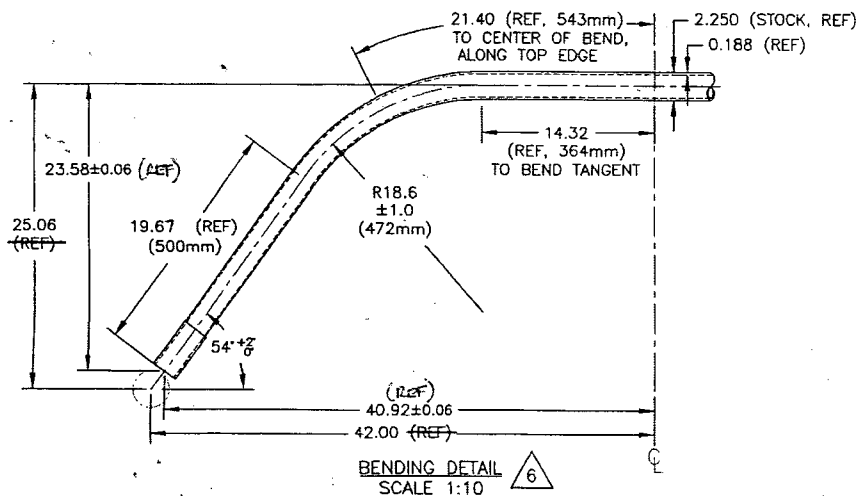
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RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 35531

**RELEASED**  
*00.11.24 #*

A2	01.07.16	UPDATE DIM TO FIRST HOLE	<i># CP</i>
A1	01.03.07	ADD D058-676-501 P/N	<i># CP</i>

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UNDER REVIEW  
06.10.17  
update view 0-0

RELEASED  
00.11.24

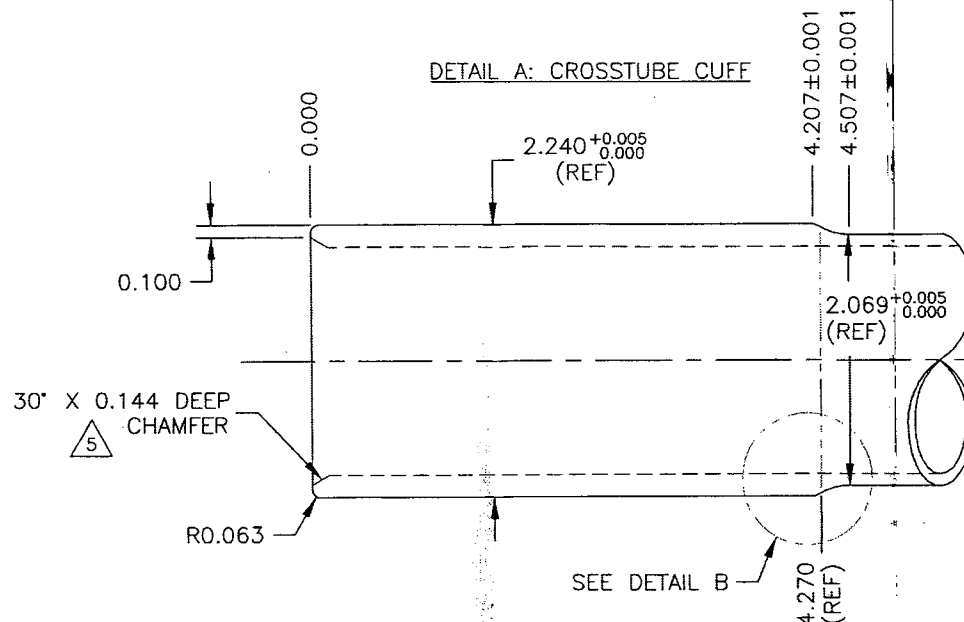
COPYRIGHT © 2000 BY DART AEROSPACE LTD.		DESIGN CP	DRAWN BY CP	<b>DART</b> DART AEROSPACE LTD. HARRISBURG, ONTARIO, CANADA	REV. A
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.		CHECKED CP	APPROVED CP	DRAWING NO. D058-676-141	SHEET 2 OF 3
		DATE 00.11.17		TITLE CROSSTUBE ASSEMBLY (04-57 HIGH FWD)	SCALE 1:10

WORK ORDER  
NO. 135531  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
UNCONTROLLED COPY  
ENGINEERING  
RETURN TO  
SHOP COPY  
2-06-26

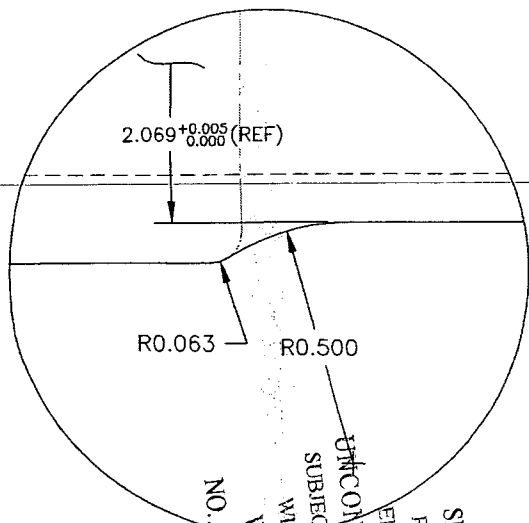


RELEASED  
00.11.14

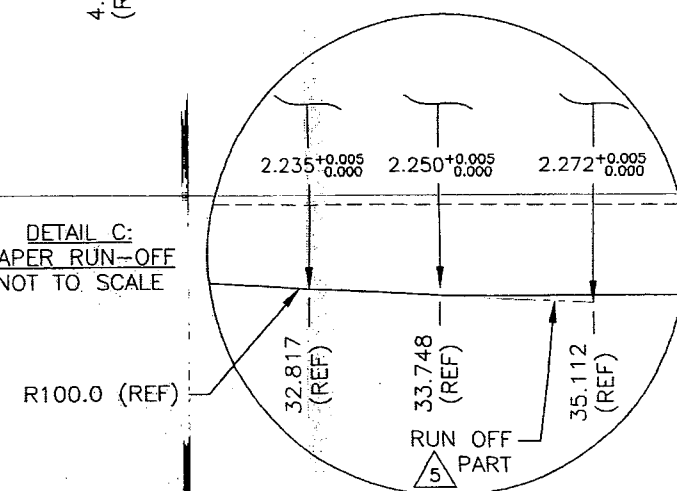
DETAIL A: CROSSTUBE CUFF



DETAIL B:  
CUFF TRANSITION  
SCALE 4:1



DETAIL C:  
TAPER RUN-OFF  
NOT TO SCALE



UNDER REVIEW

06.10.13 RH  
Update View A-D

BH  
07.06.06

NO. 35531  
WORK ORDER  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
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ENGINEERING  
RETURN TO  
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DESIGN *CP*  
CHECKED *#*  
DATE 00.11.17  
DRAWN BY *CP*  
APPROVED *#*

**DART** DART AEROSPACE LTD.  
HAMPSHIRE, ENGLAND, CANADA

DRAWING NO. D058-676-141  
REV. A  
SHEET 3 OF 3  
SCALE  
TITLE CROSSTUBE ASSEMBLY (CR-SS High Fwd) 1:1

